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ABSTRACT

This study examined the prevalence of Attention Deficit Hyperactivity Disorder (ADHD) among school children in Arkansas for the purpose of helping school districts plan appropriate educational interventions. The ADHD Survey was mailed to all 311 school superintendents; 128 surveys were returned. Findings revealed that, overall, 3 percent of students in the state were identified as ADHD. In some districts, however, as many as 25 percent of students received this diagnosis. The vast majority of school districts reported they utilize behavior rating scales/checklists in identifying children with ADHD. Ritalin was taken by ADHD students in all districts. Other medications reported as commonly used included Cylert, Dexedrine, Tofranil, Norpramin, and Adderall. Respondents indicated that drug administrations are most often supervised by nurses or nursing personnel (45.3 percent), although 32 percent of districts reported that "multiple" dispensers are responsible for delivery of prescription drugs. Behavior modification techniques were identified as the most frequently used supplement to medication (67.9 percent) and medical evaluations as the typical first step in the evaluation process (52.1 percent). However, only 64 percent of districts reported using a physician's report in arriving at a diagnosis of ADHD. (Contains 40 references.) (DB)

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Prevalence of Attention Deficit Disorders in Arkansas

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Abstract

The purpose of this study was to determine the prevalence of Attention-Deficit Hyperactivity Disorder (ADHD) among school children in a mid-southern state, and to gather relevant information which can assist school districts in planning appropriate educational interventions. The ADHD Survey (ADDS) was mailed to 311 school superintendents; 128 (41.1%) were returned. Findings revealed that, overall, 3% of students in the state are identified as ADHD, although in some districts, as many as 25% of students have received this diagnosis. The vast majority of school districts utilize some type of behavior rating scales/checklists in identifying children with ADHD. Ritalin is taken by ADHD students in all districts. Other medications in common use include Cylert, Dexedrine, Tofranil, Norpramin, and Adderall. The administration of medications is supervised most often by nurses/nursing personnel (45.3%). However, 32% of the districts reported that "multiple" dispensers are responsible for the delivery of prescription drugs. Behavior modification techniques are the most frequently used supplement to medication (67.9%). Medical evaluations are typically the first step in the evaluation process (52.1%), although only 64% of the districts reported using a physician's report in arriving at a diagnosis of ADHD. The implications of these findings are discussed, as well as recommendations for future research.

Prevalence and Identification of Attention-Deficit Hyperactivity Disorder in a Mid-Southern State

Attention Deficit Hyperactivity Disorder (ADHD) is probably the most widely researched and best known of any of the childhood behavioral disorders, having received significant notice in the psychological, educational, and medical literature for the past decade. Characterized primarily by inattention, impulsivity, and motor restlessness, ADHD is presumed to be the result of some underlying neurological dysfunction (Heilman, Voeller, & Nadeau, 1991; Riccio, Hynd, Cohen, & Gonzalez, 1993; Voeller, 1991) which manifests itself in the preschool years.

In addition to these fundamental difficulties, several other symptoms have been associated with ADHD, chief of which is poor academic performance. Children with ADHD are two to three times more likely than other children to be retained in grade before reaching high school (Greenberg & Horn, 1991), and up to 40% may eventually be placed in formal special education programs for children with learning disabilities or behavioral disorders (Barkley, 1990).

It also has been demonstrated that children with ADHD exhibit more language difficulties (Barkley, DuPaul, & McMurray, 1990; Hartsough & Lambert, 1985), more minor physical anomalies and health problems (Firestone, Lewy, & Douglas, 1976; Hartsough & Lambert, 1985), more sleep problems (Trommer, Hoeppner, Rosenberg, Armstrong, & Rothstein, 1988), more difficulties with problem-solving and organizational strategies (Hamlett, Pellegrini, & Conners, 1987), poorer motor coordination (Barkley, et al., 1990), and a greater degree of difficulty with oppositional and defiant behavior, aggressiveness, and conduct problems (Barkley et al., 1990; Loney & Milich, 1982) than do normal children. Not surprisingly, therefore, it is estimated that more than 50% of children with ADHD also have significant difficulties in social relationships with other children (Pelham & Bender, 1982).

Despite the extensive research on this disorder, the prevalence of ADHD remains in question (Barkley, 1990). It is estimated that children with ADHD

constitute up to one half of the referrals to psychiatric clinics in the United States (Barkley, 1990) and represent approximately 3-9% of the school-aged population nationwide (American Psychiatric Association, 1994). Regardless, prevalence estimates have varied widely as a function of disparities in defining symptoms, instrumentation and data collection procedures, and information sources (Barkley, 1990). In addition to methodological issues, problems with differential diagnosis and comorbidity of ADHD with other disorders may also impact resulting prevalence rates (Epstein, Shaywitz, Shaywitz, & Woolston, 1991; Riccio, Gonzalez, & Hynd, 1994).

The general lack of consensus as to the best method for defining ADHD may represent the greatest barrier to obtaining accurate prevalence information. Although the disorder has been characterized as neurological in nature (Heilman et al., 1991; Riccio et al., 1993; Voeller, 1991), its diagnosis typically is based on behavioral criteria included in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association, 1994). These criteria, which require the presence of six of 18 behaviors, exceeding a subjectively determined level of impairment in academic, social, or occupational functioning, result in the potential for any number of different combinations which could lead to a diagnosis of ADHD (Barkley, 1990). Clearly, such marked heterogeneity in form and severity precludes the precise measurement of the extent of the problem and has even compelled some researchers (e.g., Barkley, 1982; Bloomingdale & Sergeant, 1988) to formulate their own definitions of ADHD in order to select subjects for study.

Another obstacle to accurate prevalence estimates involves the variety of instrumentation and data collection procedures utilized in arriving at an ADHD diagnosis. Despite its status as a neurologically-based disorder, there are no established biochemical markers specific to ADHD (Block, 1996). Thus, the preponderance of data are collected via interviews, behavioral observations, and rating scales, even in many cases where the diagnostic avenue has been a *medical* evaluation. Although rating scales are often

portrayed as more objective than either interviews or observations, they are not without difficulty. Dykman, Ackerman, and Raney (1992) identified 42 rating scales that have been used to diagnose ADHD. Of these, according to Dykman et al., the original Conners (Conners, 1969, 1970) and the Achenbach rating scales (Achenbach, 1991) have been used more widely in studying ADHD than any others. However, at present, there are no empirical indicators on these scales that consistently identify children with ADHD (Gordon, 1991); there are no valid cutoff points which accurately identify ADHD students (Taylor, 1986); nor have these measures been revised to reflect DSM-IV criteria (Dykman et al., 1992). Although some more recently developed instruments, namely the Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 1992) and Attention Deficit Disorder Evaluation Scale (ADDES; McCarney, 1989a, 1989b) show promise, there has been insufficient research to demonstrate their diagnostic utility (Dykman et al., 1992).

In a related issue, diagnosis--and thus, prevalence--of ADHD may be impacted by the particular informants involved in the assessment process. For example, parents and/or teachers may be inaccurate in reporting children's behavior, thereby hindering reliable identification.

Finally, a major challenge in arriving at prevalence data is distinguishing ADHD from other related psychiatric syndromes. ADHD has been found to co-exist with virtually every disorder of childhood and adolescence, including mental retardation, substance abuse, Tourette's Syndrome, conduct disorder, oppositional defiant disorder, various mood and anxiety disorders, borderline personality, and learning disorders (Dykman et al., 1992). Biederman, Newcorn, and Sprich (1991), in a review of the literature on disorders frequently co-occurring with ADHD, reported that 30-50% of children with ADHD may also be diagnosed with conduct disorder; 35% with oppositional defiant disorder; 15-75% with mood disorders; and 25% with anxiety disorders. Sixty percent of children with Tourette's Syndrome and 25% of those with borderline personality have a co-morbid attention deficit disorder. In addition, ADHD occurs three to four times more frequently in mentally retarded

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children than in normals, particularly in the mildly retarded group (Biederman et al., 1991). Learning disabilities (LD) also are prevalent among children with ADHD. Ackerman and Dykman (1990) suggest that approximately one-third to one-half of all ADHD children are LD, depending on the criteria one uses to label a child LD. Among LD populations, the reported prevalence of ADHD has varied from 48% (Holborow & Berry, 1986) to 80% (Safer & Allen, 1976). This considerable overlap with a number of other disorders not only raises the question of ADHD's validity as a distinct diagnostic entity, but has the potential to impact significantly upon reported prevalence rates.

The behavioral heterogeneity and high levels of comorbidity characteristically associated with ADHD also have important implications for the differential effectiveness of various treatment approaches, particularly pharmacological ones. Some have argued (e.g., Block, 1996) that once a diagnosis of ADHD is made, physicians all too frequently move on to prescribing stimulant medications, such as Ritalin, Cylert, or Dexedrine. Despite the fact that these drugs cannot do all things for such a heterogeneous group, the use of medication in the treatment of children with ADHD is widely accepted and commonly practiced (Barkley, 1990; Greenhill, 1992). Indeed, Reid, Maag, Vasa, and Wright (1994) reported that 90% of their ADHD sample was receiving medication; Wolraich et al. (1990) reported a medication rate of 88%.

This widespread use of drug therapy also bears a considerable impact on educational systems. Because children spend a significant proportion of their day in school, medication use among students with ADHD often places teachers, school nurses, and administrators in the role of medical managers. This function carries with it a number of responsibilities, including accountability for controlled substances, preservation of a child's right to confidentiality, monitoring of medication efficacy, and awareness of possible side effects (Reid et al., 1994). The potential for student risk is high when schools are not mindful of these obligations.

Unfortunately, we have few specifics about how and how well students

with ADHD are being served in schools because of a dearth of literature on this topic (Chesapeake Institute, 1992; Reid, Maag, & Vasa, 1993; Reid et al., 1994). Placements for these students may range from regular classroom with no services, to regular classroom with accommodations, to a variety of special education settings. In any case, as an adjunct to pharmacological therapy, they likely experience an assortment of nonmedical treatments, including positive reinforcement, token economies, contingency contracting, response cost, and time out (DuPaul, Guevremont, & Barkley, 1991; Franks, 1987; Wallander & Hubert, 1985). Overall, behavior therapy appears to have fared well in the schools. Gadow (1985), in a review of 16 studies comparing the use of medication and behavioral interventions, concluded that the latter was far more effective in remediating academic difficulties. Additionally, such interventions when coordinated with parent involvement, are believed by many to facilitate the generalization of treatment effects across settings and behavioral domains (Barkley, 1990).

Because children with ADHD have specific needs that must be met in order for them to achieve academic success, it is imperative that school systems recognize these students early and develop appropriate educational programming. Epidemiological research can assist this planning by providing a best estimate of the prevalence of the disorder within a given population (Francis, 1993). Unfortunately, since few studies have examined ADHD among school-based samples (Chesapeake Institute, 1992; Reid et al., 1993, 1994), we know little about the methods used to identify ADHD students, the types of placements and services they are obtaining, or the treatments and interventions they are receiving. Thus, the primary purpose of the present investigation was to estimate the prevalence of ADHD among school children in a mid-southern state and to gather relevant information which can assist school districts in planning appropriate educational interventions.

Method

Instruments

The ADHD Survey (ADDS), which was developed specifically for this study,

contained 11 items and was divided into five major areas of concern, namely: (1) prevalence of ADHD; (2) diagnosis of ADHD; (3) placement of ADHD students; (4) interventions for ADHD; and (5) referral process utilized.

Subjects and Procedure

The ADDS was mailed to all 311 superintendents of school districts in the state in which the study was undertaken. The superintendents were given three weeks in which to respond. This secured an initial response rate of approximately 30%. When the three weeks had elapsed, a second mailout to all superintendents was undertaken, increasing the response rate by an additional 10%. Thus, overall, 128 superintendents (41.1%) returned the ADDS, representing school districts with enrollments ranging from 90 to 20,328 students (M = 1671.6, SD = 2634.3).

Results

Prevalence of ADHD

The number of children in each school district identified as ADHD ranged from 1 to 563 students (M = 43.6, SD = 92.7). As such, the ADHD prevalence rate ranged from 0.21 to 25.02% per school district, with an overall mean of 3.03% (SD = 3.37%). Frequency distributions of the prevalence rates are reported in Table 1. All school districts identified ADHD students in the elementary and middle school grades (M = 2.8, SD = 2.4). Indeed, 60.0% of school districts identified ADHD children by Grade 1, with 78.1% rendering a diagnosis by Grade 5, and 92.4% by Grade 6.

Diagnosis of ADHD

With regard to instrumentation utilized in diagnosing ADHD, one-third of school districts reported using only the ADDES. The next most commonly utilized (28.8%) method involved a battery of tests, including tests of intelligence, achievement, personality, motor skills, and perceptual skills, as well as behavior rating scales/checklists. This was followed by behavior rating scales/checklists only (17.1%); and ADDES and behavior rating scales/checklists only (3.6%). As many as 13.5% did not use any instruments in identifying ADHD children.

Aside from diagnostic instruments, a physician's diagnosis/report (64.1%) was cited as the most common criteria utilized in making a determination of ADHD. This was followed, respectively, by teacher(s)' observation/report (50.8%), parent(s)' observation/report (30.5%), report/diagnosis by Child Study Centers/other agencies (8.6%), school psychology specialists' observation/report (6.3%), committee decisions (6.3%), student achievement (4.7%), and school and/or discipline records (3.1%).

Placement of ADHD Students

On average, 39.1% (*SD* = 32.5%) of ADHD students in each school district are served under the Individuals with Disabilities Education Act (IDEA), 19.6% (*SD* = 27.6%) are served under Section 504 of the Rehabilitation Act of 1973, and 40.1% (*SD* = 36.6%) receive no services.

Interventions for ADHD

With respect to medications administered to ADHD students, Ritalin was reported as the most common--taken by ADHD students in all school districts. The administration of Cylert (53.5%) was the next most frequently reported, followed by Dexedrine (47.2%), Tofranil (22.0%), Norpramin (10.2%), and Adderall (7.9%). Between 0.8% and 1.6% of school districts reported use of one or more of the following by students with ADHD: Tegretol, Thorazine, Depakene, Mellaril, Desoxyn, Prozac, Adapin/Sinequan, and a combination of vitamins.

The administration of medications is supervised most often by nurses/nursing personnel (45.3%). In addition, 7.8% of the districts reported medication administration as being carried out by teachers, 7.0% by principals/administrative staff, and 5.5% by secretaries. Thirty-two percent of the districts reported that multiple dispensers are responsible for the administration of medications.

Aside from medications, behavior modification is the most frequently utilized intervention (67.9%). Examples of this included time out, loss of privileges, positive reinforcement, and punishment. Other interventions cited by superintendents were the use of structured classrooms (33.6%),

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shortened/modified assignments and/or tests (21.1%), home-school contracting (14.1%), counseling (8.6%), special seating arrangements (8.6%), change of placement/special education (7.8%), contracts (5.5%), special materials (3.9%), tutoring (3.1%), essential skills training (2.3%), staggering low/high interest materials (1.6%), alternative discipline (1.6%), social skills training (1.6%), brief activity periods (0.8%), mentoring with teachers (0.8%), diet control (0.8%), parent contract (0.8%), and textbooks on tape (0.8%). Only one superintendent reported that her/his school district did not utilize other interventions for ADHD in addition to medication.

Nearly all (92.9%) school districts had a designated Section 504 "coordinator" who was responsible for overseeing the design/implementation/follow-through on accommodations made for ADHD students. In these school districts, the individuals responsible for coordinating this provision included directors of special services (26.6%), principals (22.3%), counselors (17.0%), assistant superintendents (10.6%), superintendents (8.5%), federal program directors (6.4%), local education authority directors (4.3%), resource teachers (3.2%), and assistant principals (1.1%).

With respect to the referral process utilized in school districts for identifying ADHD children, teacher-parent combinations are the most common referral source (56.6%), followed by teachers alone (23.8%), and parents alone (14.8%). The survey revealed that ADHD children are most often referred to resource teachers (26.9%), followed by principals (21.0%), counselors (12.6%), physicians/nurses (12.6%), special committees (e.g., Section 504 personnel), a combination of regular classroom teachers, special education teachers, and principals (4.2%), a combination of counselor and principal (4.2%), regular classroom teachers (2.5%), and a combination of regular classroom teachers and counselors (1.7%). In slightly more than one-half (52.1%) of school districts, a medical evaluation preceded a psychoeducational evaluation in identifying ADHD children. In 31.4% of school districts, the reverse is true (i.e., a psychoeducational evaluation preceding a medical evaluation). The remainder of school districts either rely on the recommendation of teams (14.9%) or use

both psychoeducational evaluation and medical evaluations concurrently (1.7%). Overall, 45.8% of school districts utilize the concept of multidisciplinary child study teams/student assistance teams/student intervention teams as part of the referral process. The role of these teams include the following: to make recommendations for/against evaluation (27.3%), to collaborate on ideas for intervention (27.3%), to conduct screening/evaluations (7.2%), to coordinate the entire referral process (7.2%), to discuss progress and needs (5.5%), to make educational decisions for students suspected of having ADHD (5.5%), and to provide support for parents (5.5%).

Discussion

The ADDS revealed that approximately 3% of school-aged students in this mid-southern state are diagnosed with ADHD. This finding is consistent with the national estimate of 3-9% (APA, 1994). A somewhat disturbing finding was the fact that, in some school districts, as many as 25% of students are identified as being ADHD. This raises the possibility that inappropriate numbers of children are receiving this diagnosis. As noted earlier (Barkley, 1990), prevalence estimates may be impacted by a number of factors, including diagnostic procedures, instrumentation, and informants. It is clear from this study's findings that there is little statewide standardization in procedures for identifying ADHD children--a conclusion which is consistent with what appears to be a troubling national trend (Reid et al., 1993). Not only does the referral process in this state vary widely from district to district, but only 64% of the local education authorities (LEAs) report considering a physician's diagnosis in making an ADHD determination. Additionally, most of the districts appear to rely heavily on the use of a variety of behavior rating scales and checklists in arriving at a diagnosis, despite the questionable reliability and validity of these instruments noted earlier (Dykman, et al., 1992; Gordon, 1991; Taylor, 1986).

With regard to the placement of children with ADHD, approximately 39% are receiving special education services under IDEA. Although the prevalence of children with ADHD who require special education has not been studied

directly, estimates suggest that approximately 50% are, in fact, in need of such services (Council for Exceptional Children, 1992), either because of the direct results of their attentional difficulties or because of some concomitant educational disability. This estimate would seem reasonable, given the multitude of data noted earlier (e.g., Biederman et al., 1991; Dykman et al, 1992) linking ADHD with virtually every childhood disorder. In any case, it would appear that at least some ADHD students in this state are not receiving necessary special education services.

As for the 20% of ADHD students who are being served under Section 504, although nearly all districts designated a "504 coordinator," a significant proportion (50%) of these individuals fill roles which seem considerably removed from the site of service implementation (e.g., superintendents, assistant superintendents, directors of special services, LEA directors). This raises questions of appropriate monitoring of and accountability for individual accommodations plans, which all too often, may be perused and forgotten by the overburdened regular classroom teacher. Indeed, there is some evidence to suggest that teachers in the general classroom feel unprepared to deal with the needs of ADHD students (Reid et al., 1994).

Although this survey did not ask respondents to estimate the number of ADHD children receiving pharmacological treatment, it is clear that a spectrum of stimulant, antidepressant, antiseizure, and antihypertensive medications are being used by children in every district. Perhaps of gravest concern in this study was the finding of the variety of individuals responsible for the administration of these controlled substances, with 32% of the districts reporting the use of "multiple" dispensers. As noted earlier (Reid et al., 1994), the culpability inherent in medical management is considerable, not to mention the risk to students in situations in which teachers, administrators, and others may be unaware of potential adverse side effects.

An encouraging finding in this study was the report of extensive usage of non-pharmacological intervention as a corollary to drug therapy for ADHD students. Indeed, only one school district indicated that it used no

additional treatment methods. Given the reported superiority of behavioral strategies in the management of ADHD (Gadow, 1985), this is clearly representative of a best practices approach.

Implications and Recommendations

It is apparent that differences in conceptualization and diagnostic procedures are major factors in the estimation of prevalence rates for ADHD. A priority of research and practice must be, therefore, a consensus regarding the defining features of this disorder and a standardization of approaches to identification and differential diagnosis.

Future research also should examine the specific disability conditions which qualify some ADHD students for special education placement, comparing the characteristics of those students to those who are maintained in the regular classroom.

School districts must establish a foolproof system of follow-up and accountability for the implementation and evaluation of individual accommodations plans written for ADHD students who are being served under Section 504. Regular classroom teachers must be equipped with knowledge of ADHD and an arsenal of skills to handle the difficulties experienced by these students in the inclusive environment.

Teachers, administrators, and staff who are involved in dispensing medication to students with ADHD should be educated in potential adverse reactions and side effects. Schools should maintain a reliable line of communication with parents and physicians in the event that any problems related to medication arise.

Finally, given the paucity of research on ADHD in the schools, future investigations should focus on accumulating data in the academic environment, where the disorder is, arguably, most pernicious.

It is imperative that we design and implement appropriate interventions to ensure that children with ADHD experience success in school and beyond. Only with additional knowledge and understanding of this disorder will we have the tools to accomplish this goal.

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Table 1

Frequency Distribution of Prevalence Rates

Prevalence Rates*	Percentage of School Districts
0.0 - <1.0	12.5
1.0 - <2.0	28.9
2.0 - <3.0	22.6
3.0 - <4.0	12.5
4.0 - <5.0	7.8
5.0 - <6.0	3.1
6.0 - <7.0	1.6
7.0 - <8.0	1.6
8.0 - <9.0	0.8
9.0 - <10.0	0.0
≥10.0	3.9
25th percentile = 1.3%; median = 2.2%; 75th percentile = 3.7%; semi-interquartile range = 1.2%	

* 4.7% of school districts did not report prevalence rates